

WHAT IS CLAIMED IS:

1. A modular insulation blanket, comprising
a plurality of batting blocks and a cover having sealed perimeter edges and a plurality
5 of modules, the cover comprising a distal layer and a proximal layer, the layers being mated
in sealed relationship along a heat-sealed seam with the batting blocks disposed between said
layers within the modules which are separated by the heat-sealed seams.
2. An insulation blanket for thermal and/or acoustical insulation of a surface of a
structure, comprising:
10 a modular insulation blanket comprising:
a plurality of batting blocks formed of woven insulating materials, non-woven
insulating materials or combinations thereof; and
a cover having sealed perimeter edges and a plurality of modules, the cover
comprising a distal layer and a proximal layer, the layers each having perimeter edges
15 and being formed of a flexible, thermoplastic film sheet mated in heat sealed
relationship along a plurality of heat-sealed seams, the batting blocks being disposed
between said layers within the modules which are separated by the plurality of heat-
sealed seams, the layers being mated in sealed relationship at the perimeter edges.
3. The blanket of claim 1 or claim 2, further comprising a retention system comprised of
20 a plurality of attachment means affixed to the proximal layer of the cover.
4. The blanket of claim 1 or claim 2, wherein each layer has an interior cover surface
and an exterior cover surface, the blanket further comprising at least one mechanical fastener
joining each batting block to at least one interior cover surface of the module in which said
batting block is disposed.

5. The blanket of claim 1 or claim 2, wherein each layer has an interior cover surface and an exterior cover surface and each of the plurality of batting blocks are attached to at least one interior cover surface of the module in which said batting block is disposed.
6. The blanket of claim 1 or claim 2, wherein at least one of the heat-sealed seams is
5 perforated to provide a tear-line.
7. The blanket of claim 1 or claim 2, wherein at least one of the heat-sealed seams is a foldable seam.
8. The blanket of claim 1 or claim 2, wherein at least one of the heat-sealed seams is perforated to provide a tear-line and at least one of the heat-sealed seams is a foldable seam.
- 10 9. The blanket of claim 1 or claim 2, wherein the distal cover layer of the plurality of modules is perforated to allow the module to breath.
10. The blanket of claim 1 or claim 2, further comprising a breather in the distal cover layer of each of the plurality of modules.
11. The blanket of claim 1 or claim 2, further comprising a plurality of attachment means
15 affixed to the exterior surface of the proximal cover layer.
12. The blanket of claim 1 or claim 2, further comprising a retention system selected from the group consisting of a mated mechanical attachment system, a peel-and-stick tape system, a hook-loop retention system, tape, combined hook and loop and peel and stick tape retention systems, self-adhering retention systems, adhesives, a plurality of mechanical fasteners, and
20 combinations thereof.
13. The blanket of claim 1 or claim 2, wherein the cover has at least four sealed perimeter edges, the blanket further comprising an attachment means affixed to at least one of the sealed perimeter edges, said attachment means being selected from a group consisting of a mated mechanical attachment system, a peel-and-stick tape systems, a hook-loop retention
25 system, tape, combined hook and loop and peel and stick tape retention systems, self-

adhering retention systems, adhesives, a plurality of mechanical fasteners, and combinations thereof.

14. The blanket of claim 1 or claim 2, wherein the cover has at least two opposed sealed perimeter edges, the blanket further comprising an attachment means affixed to each of the at
5 least two opposed sealed perimeter edges.

15. The blanket of claim 1, wherein the cover layers are formed of a thermoplastic film sheets.

16. The blanket of claim 15, wherein the thermoplastic film sheets are selected from the group consisting of synthetic polymers, copolymers, coextruded polymers, combinations
10 thereof and laminated thereof.

17 The blanket of claim 2, wherein the thermoplastic film sheet is selected from the group consisting of synthetic polymers, copolymers, coextruded polymers, combinations thereof and laminated thereof.

18. The blanket of claim 1, wherein the cover layers are formed of a thermoplastic film
15 sheet or film laminate selected from the group consisting of polyvinyl fluoride, polyimide, polyetheride, polyvinyl chloride, polyurethane, polypropylene, polyethylene terephthalate, and combinations thereof.

19. The blanket of claim 2, wherein the thermoplastic film sheet is selected from the group consisting of polyvinyl fluoride, polyimide, polyetheride, polyvinyl chloride,
20 polyurethane, polypropylene, polyethylene terephthalate, and combinations thereof.

20. The blanket of claim 1 or claim 2, wherein each of the plurality of modules has interior dimensions defining a module area and the batting blocks are sized to substantially conform to the module area of the modules in which they are disposed.

21. The blanket of claim 1 or claim 2, wherein the insulating blanket is sized in standard dimensions that substantially conform with the dimensions of an insulation area of an aircraft fuselage.

22. The blanket of claim 1 or claim 2, further comprising a hook and loop retention
5 system.

23. The blanket of claim 1 or claim 2, further comprising a plurality of noise dampers adhered to the proximal layer.

24. The blanket of claim 1 or claim 2 further comprising a plurality of noise dampers and a hook and loop retention system both adhered to the proximal layer.

10 25. An insulated aircraft fuselage, comprising:

an aircraft fuselage, the fuselage having an interior skin surface and an exterior skin surface, the interior skin surface bearing a series of struts in spaced relationship; and

a modular insulation blanket system comprising a plurality of modular insulation blankets, the insulation blankets each being comprised of a plurality of batting blocks and a
15 cover having sealed perimeter edges and a plurality of modules, the cover comprising a distal layer and a proximal layer, the layers being mated in sealed relationship with the batting blocks disposed between said layers within the modules which are separated by heat-sealed seams, the insulation blankets being affixed to the interior skin surface of the fuselage, the insulation blankets being adhered to the interior skin surface between the struts.

20 26. The insulated aircraft fuselage of claim 25, further comprising a retention system.

27. The insulated aircraft fuselage of claim 25, wherein the retention system is selected from the a group consisting of a mated mechanical attachment system, a peel-and-stick tape systems, a hook-loop retention system, tape, combined hook and loop and peel and stick tape retention systems, self-adhering retention systems, adhesives, a plurality of mechanical
25 fasteners, and combinations thereof.

26. The aircraft fuselage of claim 25, wherein the insulation blankets are affixed in constant, conforming interface with the interior skin surface.

27. The aircraft fuselage of claim 25, wherein the distal cover layer of the plurality of modules is perforated to allow the modules to breath.

5 28. The aircraft fuselage of claim 25, further comprising a breather in the distal cover layer of each of the plurality of modules.

31. The aircraft fuselage of claim 25, further comprising a plurality of attachment means affixed to the exterior surface of the proximal cover layer.

32. A method of making a modularized insulation blanket, comprising the steps of :

10 . providing a distal cover layer, the distal cover layer having a perimeter edge, an interior surface, an interior surface and a central region;

positioning a plurality of batting blocks on the central region of the interior surface of the distal cover layer in spaced relationship so as to provide a mating space between the batting blocks;

15 providing a proximal cover layer, the proximal cover layer having a perimeter edge, an exterior surface, an interior surface and a central region, the proximal cover layer being sized to provide sufficient material to form modules surrounding and encapsulating the batting blocks on all sides in conjunction with distal layer;

20 placing the proximal cover layer over the distal cover layer and the plurality of batting blocks positioned thereon with the portions of the layers at their perimeter edges and within the mating spaces between batting blocks overlapping and aligned in mating relationship;

applying heat and pressure to the cover layers along the perimeter edges and along the mating spaces between batting blocks to seal the perimeter edges and to form a plurality of heat sealed seams along the mating spaces, the heat sealed seams defining a plurality of
25 modules with batting blocks disposed between the cover layers.

34. The method of claim 32, further comprising the step of perforating at least one of the heat sealed seams to provide a tearable heat sealed seam.

35. The method of claim 32, further comprising the steps of perforating at least one of the heat sealed seams to provide a tearable heat sealed seam and the distal cover layer and/or proximal cover layer to provide a breathing system in each of the plurality of modules.

36. The method of claim 32, wherein at least one heat sealed seam is a foldable seam.

37. The method of claim 32, wherein the mating space between at least one pair of adjacent batting blocks is sized to accommodate a foldable heat-sealed seam, the method further comprising the step of providing an odd number of creases to the heat sealed seam formed between the at least one pair of adjacent batting blocks to form the foldable heat-sealed seam, the odd number of creases being at least three creases.

38. An apparatus for forming insulation blankets, the apparatus comprising:

a platen sized and configured to receive a blanket assembly comprised of a distal layer, a proximal layer and a plurality of batting blocks disposed there between in spaced relationship with a plurality of spaces between batting blocks defining mating spaces in which the distal and proximal layers overlap;

at least one edge sealer; and

a plurality of heat seal rollers, the rollers being spaced apart a predetermined distance in alignment with the mating spaces.

39. The apparatus of claim 38, wherein the heat seal rollers and portions of the platen are in alignment with the mating spaces and are configured to cooperate together to apply heat and pressure to portions of distal and proximal layers overlapping within the mating spaces to form heat-sealed seams.

40. The apparatus of claim 39, wherein the heat seal rollers and portions of the platen in alignment therewith are configured with a plurality of perforation elements and a plurality of recessed dentitions that correspond to and receive the perforations elements.

41. The apparatus of claim 38, wherein the heat seal rollers and the portions of the platen in alignment therewith are configured to form heat sealed seams selected from the group consisting of non-foldable heat sealed seams, foldable heat-sealed seam, perforated heat-sealed seams, perforated and foldable heat-seal seams.

42. An apparatus for forming insulation blankets, the apparatus comprising:

a platen sized and configured to receive a blanket assembly comprised of a distal layer, a proximal layer and a plurality of batting blocks disposed there between in spaced relationship with a plurality of spaces between batting blocks defining mating spaces; at least one edge sealer; and a heat seal mechanism.

43. The apparatus of claim 42, wherein the heat seal mechanism comprises a lattice of interconnected heat sealing elements which intersect and are oriented longitudinally and latitudinally.

44. The apparatus of claim 43, wherein the mating spaces have a width and the heat sealing elements have a width corresponding to the width of the mating spaces.

45. The apparatus of claim 43, wherein the heating elements and portions of the platen in alignment with the mating spaces are configured to cooperate together to apply heat and pressure to portions of distal and proximal layers overlapping within the mating spaces to form heat-sealed seams.

46. The apparatus of claim 43, wherein the heating elements and portions of the platen in alignment therewith are configured with plurality of perforation elements and a plurality of recessed dentitions that correspond to and receive the perforations elements.

47. The apparatus of claim 43, wherein the heating elements are configured to form heat sealed seams selected from the group consisting of non-foldable heat sealed seams, foldable heat-sealed seam, perforated heat-sealed seams, perforated and foldable heat-seal seams.

48. The apparatus of claim 38 or claim 42, further comprising an actuating mechanism.

5 49. The apparatus of claim 38 or claim 42, further comprising an actuating mechanism, the actuating mechanism being comprised of components selected from the group consisting of drives, motors, temperature regulators, pressure regulators, time regulators, electronic controls for automated or semi-automated operation, connections to electric power sources, and combinations thereof; and temperature probes and/or pressure probes in electronic
10 communication with the actuating mechanism.